



Contribution ID: 232

Type: Poster

Study of Highly Transparent Silica Aerogel for the Belle II RICH Counter

Proximity focusing RICH based on a silica aerogel as a Cherenkov radiator has been developed for new particle identification device in the Belle II end-cap detector. For this detector, we propose new concept to employ dual aerogel layers with different refractive indices so that Cherenkov photons from each layer can be imaged as an overlapped ring on the photodetector plan. In this new idea on Cherenkov radiator, optical properties of aerogel tile in larger refractive index is of our prime importance since it is located downstream and all Cherenkov photons generated in radiator medium pass through this tile. However, it is difficult to produce transparent aerogels with refractive index $n > 1.055$ using a conventional method. Therefore, a pioneering aerogel production technique called as pin-drying(PD) method was introduced for the first time to improve transparency of the aerogel tile with larger index. In this method, synthesis process is carried out to make alcogel in the usual way. Then, as a new procedure, refractive index of each tile is controlled by changing volume size, where alcogel is placed in a semi-sealed container to proceed smooth shrinkage of alcogel. Using PD method, transmission length at wave-length of 400 nm was achieved to be more than 50 mm for the aerogel with $n \sim 1.060$. Newly produced aerogels were tested in beam at CERN PS in 2011. Clear Cherenkov image was detected, demonstrating our new aerogel is transparent enough to be adopted for the real detector.

quote your primary experiment

Belle II

Primary author: Dr ADACHI, Ichiro (KEK)

Co-authors: KAWAI, Hideyuki (Chiba university); TABATA, Makoto; SUMIYOSHI, Takayuki (Tokyo Metropolitan University)

Presenters: Dr ADACHI, Ichiro (KEK); TABATA, Makoto

Track Classification: Cherenkov Detectors